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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,479	02/26/2004	Nobuhiro Ohkubo	204552031400	3112

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EXAMINER	
VAN ROY, TOD THOMAS	

ART UNIT	PAPER NUMBER
2828	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/786,479	OHKUBO ET AL.	
	Examiner	Art Unit	
	Tod T. Van Roy	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-9,18,19,21 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-9,18,19,21 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The examiner acknowledges the amending of claim 1.

Claim Objections

Claim 1 is objected to because of the following informalities:

The new amendment to claim 1 reads: "... and contains impurity atoms having the second conductivity, contained in the second clad layer of the second conductivity type,...". The use of the word 'contained' is confusing, since it is not clear what is being contained. The Examiner suggests making it clear that the impurity atoms of the second conductivity type are that which are contained in the second clad layer.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 6-8, 18, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazumasa et al. (applicant submitted prior art, JP 2002-026450) in view of Ohkubo (US 2002/0126723).

With respect to claims 1 and 6, Kazumasa teaches a semiconductor laser device which is made from AlGaInP based material (defined in spec as being GaInP or AlGaInP, [0038]) comprising: a first clad layer of a first conductivity type (AlGaInP [0025]), an active layer ([0028]) and a second clad layer of a second conductivity type (AlGaInP [0031]) that are formed over a semiconductor substrate ([0021]), wherein a portion of said active layer in an area near a laser resonator end face has a peak wavelength in photoluminescence (PL) that is smaller than a peak wavelength in PL in a portion of said active layer in a laser resonator inner area ([0019]), and the second clad layer of the second conductivity type located in the area near a laser resonator end face contains As atoms (fig.2 #24, As taught as an impurity source [0045]). Kazumasa does not teach impurity atoms having the second conductivity type to be found in the second clad layer in the inner area or the end face or the active layer, and of group-II with an atomic number less than that of P. Ohkubo teaches a similar disordered region device wherein the entire second clad layer is doped with Be (group-II atomic number less than P) ([0213]) and the Be is also found in the active layer ([214]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the structure of Kazumasa with the clad layer doping of Ohkubo in order to prevent overflow

of carriers from the active layer and improve crystallinity of the active layer ([0231], when combined with Kazumasa's annealing).

With respect to claim 2, Kazumasa further teaches the As atom concentration in the second clad layer of the second conductivity type in the area near a laser resonator end face is higher than an As atom concentration in the second clad layer of the second conductivity type in the laser resonator inner area (fig.2, As implant only on edges, so area near resonator would inherently have more As than a central portion of the laser resonator).

With respect to claims 7 and 18, Ohkubo further teaches the Be doping to be 1x10^18 ([0233]).

With respect to claim 8, Kazumasa further teaches a GaAs contact layer of the second conductivity type formed over the clad layer of the second conductivity type in the area near a laser resonator end face and the laser resonator inner area (fig.3 #29, GaAs [0060]), and a GaInP intermediate layer of the second conductivity type formed between the second clad layer of the second conductivity type and the GaAs contact layer of the second conductivity type in the laser resonator inner area (fig.3 #25, InGaP [0035]).

Claims 21 and 22 are rejected for the same reasons outlined in the rejection to claim 8 above.

Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiyohisa et al. (applicant submitted prior art, JP 09-326526) in view of Ohkubo (US 2002/0126723).

With respect to claim 1, Kiyohisa teaches a semiconductor laser device which is made from AlGaInP based material (defined in spec as being GaInP or AlGaInP, [0038]) comprising: a first clad layer of a first conductivity type (fig.1 #3 InGaP [0008]), an active layer (fig.1 #4 [0008]) and a second clad layer of a second conductivity type (fig.1 #5 [0008]) that are formed over a semiconductor substrate (fig.1 #1 [0008]), wherein a portion of said active layer in an area near a laser resonator end face has a peak wavelength in photoluminescence (PL) that is smaller than a peak wavelength in PL in a portion of said active layer in a laser resonator inner area ([0003-5] disordering around edges leads to lower PL wavelength when compared to non-disordered inner laser resonator portion), and the second clad layer of the second conductivity type located in the area near a laser resonator end face contains As atoms (fig.1 #5, As taught as an impurity source [0004]). Kiyohisa does not teach impurity atoms having the second conductivity type to be found in the second clad layer in the inner area or the end face, and of group-II with an atomic number less than that of P. Ohkubo teaches a similar disordered region device wherein the entire second clad layer is doped with Be (group-II atomic number less than P) ([0213]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the structure of Kazumasa with the clad layer doping of Ohkubo in order to prevent overflow of carriers from the active layer and

improve crystallinity of the active layer ([0231], when combined with Kazumasa's annealing).

With respect to claim 2, Kiyohisa teaches the As atom concentration in the second clad layer of the second conductivity type in the area near a laser resonator end face is higher than an As atom concentration in the second clad layer of the second conductivity type in the laser resonator inner area (fig.1, As implant only on edges, so area near resonator would inherently have more As than a central portion of the laser resonator).

With respect to claim 9, Kiyohisa discloses a GaAs current non-injection layer of the second conductivity type is formed over the second clad layer of the second conductivity type in the area near a laser resonator end face (fig.3 #27).

Claims 3 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazumasa and Ohkubo in view of Ueno et al. (EPO 0437243A2).

With respect to claim 3, Kazumasa and Ohkubo teach the semiconductor laser device as outlined in the rejection to claim 1 above, but do not teach the As implant concentration to be between 1E18 and 1E20. Ueno teaches a semiconductor laser device with disordered regions wherein the implant concentration is taught to be 1E17 or greater (col.4 line 2) and of As (col.6 lines 9-17). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser device and As implant of Kazumasa and Ohkubo with the As implant concentration level of Ueno in

order to allow for a high amount of diffusion and disordering of the active region to sufficiently increase the bandgap energy (Ueno, col.4 lines 1-5).

With respect to claim 19, Kazumasa, Ohkubo and Ueno teach the laser device as outlined in the rejection to claim 3 above, and Kazumasa further teaches a GaAs contact layer of the second conductivity type formed over the clad layer of the second conductivity type in the area near a laser resonator end face and the laser resonator inner area (fig.3 #29, GaAs [0060]), and a GaInP intermediate layer of the second conductivity type formed between the second clad layer of the second conductivity type and the GaAs contact layer of the second conductivity type in the laser resonator inner area (fig.3 #25, InGaP [0035]).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR